

## DISASTERS AND HAZARDS AWARENESS



**NATIONAL DISASTER MANAGEMENT CENTRE**





- food;
- medicine;
- eyeglasses;;
- clothing and
- Other essential items.

#### Cautions!!!

- Do not enter the damaged site. Fires can rekindle from hidden, smoldering remains.
- Normally, the fire department will see that utilities (water, electricity and natural gas) are either safe to use or are disconnected before they leave the site. Do not attempt to turn on utilities yourself.
- Be watchful for structural damage caused by the fire. Roofs and floors may be damaged and subject to collapse.
- Food, beverages and medicine exposed to heat, smoke, soot and water should not be consumed.

#### If it is safe to do so, try to locate the following items:

- identification, such as ID book, driver's licenses and Social Security cards
- insurance information
- medication information
- eyeglasses, hearing aids or other prosthetic devices
- valuables, such as credit cards, bank books, cash and jewelry

#### There are many people/entities that should be notified of your relocation, including:

- your insurance agent/company
  - your mortgage company (also inform them of the fire)
  - your family and friends
  - your employer
  - your child's school
  - your post office
  - any delivery services
  - your fire and police departments
- Do not throw away any damaged goods until after an inventory is made.  
All damages are taken into consideration in developing your insurance claim.

#### Who should I contact for more information?

Contact your local disaster risk management centre (which can refer your query to the relevant specialist sector department or stakeholder) at:

Disaster Management Centre	Contact details
National Disaster Management Centre	012 334 0667/0404/22/19
Eastern Cape	040 609 5948
Free State	051 407 2000
Gauteng	011 355 5000
Kwa-Zulu Natal	033 897 5637
Limpopo	015 294 1887
Mpumalanga	080 020 2507
North West	018 388 1057
Northern Cape	053-807 9862
Western Cape	021 937 0800 (office hours) 021 937 0788/91(after hours)

For local weather where you are.  
Vodacom clients only: \*120\*555\*3#

In case of emergency phone  
112 from a cell phone  
10111 from a land line

[www.fireservices.gov.za](http://www.fireservices.gov.za)

In case of fire emergency,  
phone 10117



cooperative governance

Department:  
Cooperative Governance  
REPUBLIC OF SOUTH AFRICA

## NATIONAL DISASTER MANAGEMENT THUNDERSTORM AWARENESS





## National Disaster Management Centre

### thunderstorm AWARENESS

#### What are thunderstorms?

Thunderstorms, the large cauliflower-like clouds commonly seen in the summer rainfall areas of South Africa, are violent, local atmospheric disturbances accompanied by lightning (see the awareness brochure of the NDMC on lightning), thunder, heavy rain, often by strong gusts of wind (sometimes even tornadoes), and sometimes by hail. A storm normally last for about 30 minutes, but severe storms may last longer. South Africa experiences a very high incidence of thunderstorms, particularly in the summer rainfall regions.

#### *Types of thunderstorms*

##### **The Single Cell Storm**

Single cell (cloud) thunderstorms have life spans of 20-30 minutes. They are usually not strong enough to produce severe weather. A true single cell storm is actually quite rare.

##### **The Multi-cell Cluster Storm**

Multi-cell storms are the most common type of thunderstorm. It consists of a group of cells, moving as one unit, with each cell in a different phase of the thunderstorm life cycle (see below). The mature cell is usually found at the centre. Although each cell may last only 20 minutes, the cluster may last several hours. These can produce heavy rainfall, down bursts, moderate-sized hail, and occasional weak tornadoes.

##### **The Multi-cell Line Storm or "Squall Line"**

The Squall Line consists of a line of storms with a continuous, well-developed gust front (or winds) at the edge of the line of storms. This line of storms can be solid or it can have gaps. The main threats with these storms are golf ball-sized hail, heavy rainfall, and weak tornadoes. However, they are best known for their down bursts that manifests in strong wind gusts at ground that can be very damaging to structures and houses.

##### **The Supercell Storm**

The Supercell Storm is a highly organised thunderstorm. Although these are rare, they pose a great threat to life and property. This is like a single cell storm in that it has one up-draft. However, the supercell up-draft is extremely strong. This storm has a rotating up-draft, (also called a mesocyclone), that is the key to its ability to produce severe weather. This storm can produce large hail, strong down bursts, and strong violent tornadoes.

#### Life cycle of a thunderstorm

The life cycle of a thunderstorm cell can be divided into three stages which are determined by the magnitude and direction of the predominating vertical motions within the cell. These stages include (1) the developing or cumulus stage, (2) the mature stage, and (3) the dissipation stage.

##### *a. The developing stage (also called cumulus stage)*

In the developing stage a cell is formed from a collection of cumulus clouds, characterised by updrafts throughout the cell. The in-cloud temperatures in a strongly developing cell are higher than the temperatures of the surrounding environment at corresponding altitudes, resulting in strong updrafts in the clouds which can be seen in the sharply defined cauliflower-like cloud tops.

##### *b. The mature stage*

The mature stage is characterised by the existence of both updrafts and downdrafts in the lower half of the cell. The start of this stage is marked when the rain first falls distinctly out of the bottom of the cloud. It is during this stage that the most intense lightning occurs, the heaviest rains are recorded at the surface, and the strongest winds are observed. Since hail develops in all thunderstorms, hail may occur during this stage, except if warm temperatures below the cloud melted the hailstones into large raindrops.

##### *c. The dissipation stage*

The dissipating stage is characterised by weak downdrafts throughout the cell. In this stage there are no longer the updraft currents which provided the condensing water (precipitation) in the previous stage. When complete dissipation has occurred, only stratified clouds will remain

- Keep lighters and matches away from children and store them out of reach. A curious child or even just one that is trying to be helpful could seriously injure themselves and others. And never store paraffin near matches, lighters or lit paraffin appliances.

People, particularly those residing in informal settlements, should take these safety precautions into consideration, to ensure that they are safe and free from fires:

- Never leave children alone with matches or any ignition, stove or candles
- Check that any matches or lighters are stored out of sight and above a stretch zone line
- When cooking, always supervise children every moment in the kitchen
- If a pan fire occurs, smother it by covering the pan with a lid
- Be extremely careful of open flames around homes and buildings

#### **Plan ahead:**

- Keep a bucket of water and a bucket of sand ready to put out small fires before they spread.
- But don't put yourself in danger.
- Use water for wood, paper and material fires.
- Use sand for paraffin fires.

#### **Electrical fires:**

- Turn off the electricity before putting out an electric fire.

#### **Gas fires:**

- First turn off the gas. Then use a lid or damp cloth to put out the flames.
- If you can't turn off the gas, get out of your home and stay out.

#### **Calling for help**

- Know and show the emergency number and teach children how to dial your local emergency number in emergencies.
- When you phone, give the full address and a landmark or beacon such as a shop or school close to the fire to enable fire fighters to find you quickly.

#### **What to do if a fire breaks out!**

- Warn people inside the building/dwelling to get out.
- Crawl low under smoke to escape the fire.
- If your clothes catch fire,

## NATIONAL DISASTER MANAGEMENT CENTRE INFORMAL SETTLEMENT FIRE AWARENESS

### What are informal settlement fires?

Informal settlement fires are fires which occur randomly within informal settlements, and run the risk of becoming out of control. These fires are due to various reasons including human negligence, malicious intent and natural occurrences.

### Why do informal settlement fires occur?

This type of fire normally occurs due to various socio-economic reasons. Due to the historical planning and development in South Africa, most towns and cities have formal build-up areas as well as informal settlements. These informal settlements are normally not well serviced and people living here do not have adequate access to basic services. The need for land, linked to the rate of urbanisation, contributes to a high population to available land ratio. This means that more and more people are dependant on a certain piece of land. People tend to build their shacks too close to each other, which in turn heightens the risk of informal settlement fire. Due to the lack of basic services, like electricity, people are compelled to use alternative energy sources. The use of open fires for cooking and lighting is therefore common in these informal settlements. Linked to the above is inadequate education in the use of alternative energy sources. This in turn leads to incorrect use of open flames which in turn leads to informal settlement fires. Other reasons include the abuse of drug and alcohol. Intoxicated persons become negligent and knowingly and unknowingly start fires. Malicious intent is another reason why fires start.

**Experience with South Africa points to the fact that about 99% of informal settlement fires are started by humans; the other 1% are started by natural occurrences.**

### How do I know that an informal settlement fire might occur?

- It is normally during dry and/or cold season.
- Shacks are built too close to each other (less than three meters apart).
- Many people in the informal settlement are dependent on open fires for cooking, heating and lighting.
- There are moderate to strong winds present.

### Fire warnings:

The South African Department of Water Affairs and Forestry (DWAF) developed a Fire Danger Rating which aims to increase the capacity of the general public and Fire Protection Associations to manage fires by being aware of the likelihood of fires occurring in a given area at a given time. Although the fire danger rating are aimed at rural areas, it gives a good indication of the possibility of runaway shack fires.

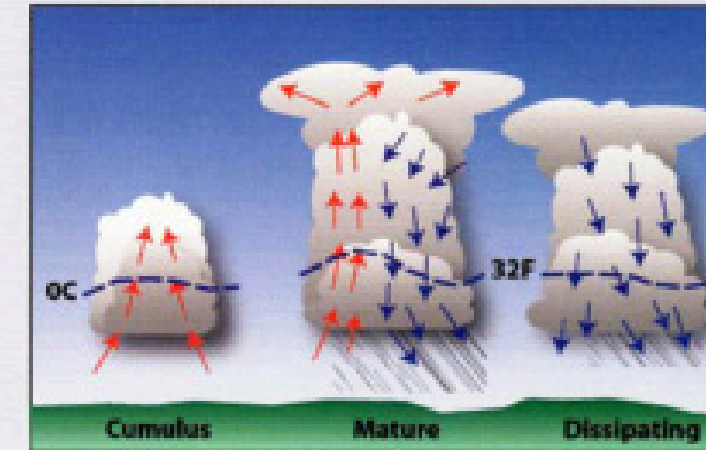
The main contributor to informal settlement fires is human negligence!

### IMPORTANT:

Always obey and react to early warnings from your local disaster management centre and your local fire office!

### Protect yourself from informal settlement fire:

- Build homes at least three metres apart to prevent fires from spreading.
- Every home needs more than one way out in case of fire.
- Keep matches, lighters, paraffin and poisons safe and far away from young children.
- Use a child safety cap on paraffin bottles.
- Keep stoves on a flat surface - away from drafts and things that can burn.
- Fires and cooking stoves should never be left unattended.
- Put out candles and lamps before you go to sleep or leave your home.
- Smoking in bed is dangerous.
- Never leave a light candle and/or paraffin appliance unattended. Before you leave a room, always turn off paraffin stoves or lights. It only takes a split second for a gust of wind, pet dog, or small child to knock over a light or stove, but what happens next could affect the rest of your life.
- Always make sure light candles and paraffin appliances are on a flat, firm surface so they cannot easily be knocked over.
- Do not put a cloth under a paraffin appliance and/or light candle. Not only could a child or pet pull the trailing end and knock over the light or stove, but if an accident does happen, the cloth will burn and help fuel the fire.
- Always have a bucket of sand nearby when using a paraffin appliance. Do not use water to put out a paraffin fire, it will not put the fire out and can make matters worse by spreading the flames. Paraffin fires can only be extinguished using sand or a fire extinguisher.



*Life cycle of a thunderstorm*

### How do I know that a thunderstorm might occur?

- You are in your normal rainy season, particularly in the summer rainfall regions.
- You observe big grey cloud formations (the base of the clouds are normally flat).
- You can feel the wind suddenly changing and blowing cooler air towards you.
- You can see lighting within the clouds of the storm and also hear far-off rumbling or thunder.
- You experience down bursts of rain.

### Two key elements which contribute to thunderstorms:

1. Warm weather which creates a significant amount of updrafts.
2. A considerable amount of noticeable cumulus clouds.

### What should I do before the thunderstorm season?

1. Learn more about your area's thunderstorm risk by contacting your local weather office or local disaster risk management centre.
2. Pick a safe place in your home where family members can gather during a storm (preferably some place in the middle of your home away from windows).
3. Trim back branches of trees from your house, clean and check roof gutters.
4. Make a list of emergency telephone numbers.

### What should I do as the storm approaches?

1. Listen to the radio for warnings or other information.
2. Suspend all outdoor activities by children.
3. Shelter pets and cover vehicles.
4. Go inside.
5. Disconnect all electrical appliances.
6. Stay away from tall trees, towers, fences and power and telephone poles.

### What should I do when the storm strikes?

1. Stay inside and shelter well clear of windows.
2. Do not take a shower or bath.
3. Avoid using the telephone.
4. If outdoors find shelter (not under a tree).
5. If driving, stop, clear of trees, power lines and streams.

### What should I do if I am caught outdoors?

1. If you are in the bush take shelter under the shortest trees. The same goes if you are in a wooden or tree plantation.
2. Lightning will seek out the highest tree.
3. If you are boating or swimming in a lake or dam return to shore and find shelter immediately.
4. Go to low-lying places away from trees, pole or metal objects.
5. Make sure the place you have chosen is not susceptible to flash flooding.

### What should I do while driving?

1. Pull safely onto the shoulder of the road and stop, making sure you are away from any trees or other tall objects that could fall on the vehicle. Stay in the car and turn on the emergency flashers until the heavy rains subside.
2. Avoid contact with metal or conducting surfaces outside or inside the vehicle.
3. Avoid flooded roadways.

#### *What should I do after the storm has passed?*

1. Beware of slippery roads, fallen power lines, damaged buildings and trees and flooded watercourses.
2. Continue listening to the radio stations for updated information.
3. Help people who may require special assistance e.g. the elderly, children, or people with special needs (disabled).
4. Stay away from storm damaged areas.
5. Report any infrastructure damage immediately to your local municipality or local disaster risk management centre.

#### **Thunderstorm warnings**

Warnings of possible thunderstorms are normally communicated by your local weather office or disaster risk management centre. If you think a thunderstorm might occur in your area be sure to regularly listen to the radio and/or watch TV. Also be aware of local disaster risk management officials making neighbourhood calls through loud speakers. A warning is only as good as your reaction to it!

#### **IMPORTANT:**

Always obey and react to early warnings from your local disaster risk management centre!

## National Disaster Management Centre INFORMAL SETTLEMENT FIRE AWARENESS



#### TREATMENT OF ICE DAMS

An ice dam is a ridge of ice that forms at the edge of a roof and prevents water from draining. Standing water behind the ice dam can leak into your home and cause extensive damage to your ceilings, walls, insulation, and other areas.

**What to Do:** To avoid damage from ice dams, such as water seeping into your property, contact a professional to see what can be done to mitigate the damage. Methods may include cutting channels in ice dams, removing snow and possibly removing gutters depending on the extent of the problem.

#### TREATMENT OF SNOW LOADS AND ROOF COLLAPSE

Snow loading is a weight factor considered in the design of a flat or pitched roof for the probable amount of accumulated snow the roofing structure can handle. Several factors affect the amount of snow that can build up on a roof, including the pitch of the roof, snow drifts which can result in uneven snow loads on the roofing structure, type of roofing material, roof valleys or other roof areas which tend to collect larger amounts of snow.

**What to Do:** Know your snow load. Snow loads for flat roofs in most jurisdictions in our region are typically 30 pounds per square foot. This roughly translates to 24 inches<sup>3</sup> to 30 inches<sup>3</sup> of snow depending on the moisture density of the snow. Sloped roofs allow for lower snow loads; the steeper the slope, the lower the allowable snow load. Watch for the warning signs of a potential roof collapse:

- Sagging ceiling or drywall.
- New cracks in the wall or the ceiling.
- Cracking or dripping sounds.
- Windows and doors that are difficult to open or close.

#### TREATMENT OF GROUND-WATER FLOODING

Ground-water flooding occurs in low-lying areas when the water table rises above the land surface and/or when water sourced from the exterior of the property floods the interior. This can cause sewer system back-ups, electrical malfunctions, damaged appliances and serious structural damage.

**What to Do:** If there is standing water, try to remove as much of it as possible and run a dehumidifier or a fan to help dry out the area. If wet areas are dried out quickly, the development of mold can be avoided. Make sure all sump pumps, drains, and gutters are unobstructed and working properly.

#### Prevention and Safety

To prevent equipment malfunctions and to maintain safety, keep heat pumps, dryer vents, furnace exhaust pipes, sump pumps, and water heater ventilation pipes and electrical meters clear of snow and ice build-up.

## NATIONAL DISASTER MANAGEMENT CENTRE DROUGHT AWARENESS





## National Disaster Management Centre

### drought AWARENESS

#### What is drought?

Drought is a normal condition of almost all climates on earth. Drought is a condition of climatic dryness that is severe enough to reduce soil moisture and water levels below the minimum necessary for sustaining plant, animal, and economic systems.

#### What types of droughts do we get?

##### Meteorological Drought

The South African Weather Service defines drought on the basis of the degree of dryness in comparison to "normal" or average amounts of rainfall for a particular area or place and the duration of the dry period. Meteorological drought is therefore linked to the average rainfall in a certain area. A deviation from normal measured rainfall could indicate a meteorological drought. Meteorological drought is therefore region specific. We might have good rainfall in the winter in the Western Cape province but severe meteorological drought in the Limpopo Province. Meteorological drought are normally monitored by the South African Weather Service.

##### Agricultural Drought

Agricultural drought occurs when there isn't enough soil moisture to meet the needs of a particular crop at a particular time. Rain-fed crops are the crops dependent on adequate rainfall during a specific period of time. Agricultural drought is typically evident after meteorological drought but before a hydrological drought.

##### Hydrological Drought

Hydrological drought refers to shortages in surface and subsurface water supplies. Water in hydrologic storage systems such as reservoirs and rivers are often used for multiple purposes such as flood control, irrigation, recreation, navigation, hydropower, and wildlife habitat. Competition for water in these storage systems escalates during drought and conflicts between water users increase significantly.

##### Socio-economic Drought

Socio-economic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply. The supply of many economic goods, such as water, forage, food grains, fish, and hydroelectric power, depends on weather. Due to variability of climate, water supply is sufficient in some years but not satisfactory to meet human and environmental needs in other years. The demand for economic goods is increasing as a result of increasing population. Supply may also increase because of improved production efficiency and technology.

#### How do I know that a drought might occur?

- We experience an unusual dry period when we normally have rain;
- There is an increased number of wind storms;
- There is an increased number of dust storms;
- We can identify diminishing water supplies in dams and reservoirs;
- There is an increase in the death rate of animals;
- There is a changes in vegetation, especially the introduction of desert plants such as scrub bushes;
- There is a change in animal behaviour (e.g. decreasing of

normal observable bird life).

- Unusual and unseasonal, changes in the prevalence rates of specific communicable diseases associated with personal and environmental hygiene, principally non-venereal skin diseases and diarrhoeal diseases, indicating the diminished use of water for washing.

#### **Drought warnings**

Warnings of dry conditions and drought are normally communicated by your local weather office or disaster risk management centre. Due to the slow onset nature of drought, it is very difficult to give a definite forewarning. We can, however, monitor our water supplies, soil moisture and water usage, which will provide us of a good indication of a possible approaching drought. Seasonal forecasts of the South African Weather Service indicating sustained below normal rainfall patterns over the coming months are also a good indication of a possible drought approaching.

#### **IMPORTANT!**

**Always obey and react to early warnings from your local disaster risk management centre!**

#### What should I do in order to reduce my risk of drought?

##### Urban dwellers:

- The most important safeguard against drought is to conserve water.
- Make use of rainwater harvesting techniques (e.g. introduce a small reservoir or tank in your garden and channel rainwater from your roof into the tank).
- Recycle used water to irrigate your garden (e.g. bath and shower water).

##### Rural dwellers:

- Identify areas which are drought prone (historical information, and traditional knowledge can be useful) .
- Determine who are the most at risk to drought (e.g. farmers with rain-fed crops, families reliant on a single source of water).
- Modify and vary crop and grazing patterns (rather plant drought resistant seeds, use feedlots and protect scrubs and trees).
- Improve animal husbandry (maintain smaller herds, eliminate unproductive animals, improve breeding practices).
- Build water retention dams and protect against evaporation.
- Use rainwater harvesting to fill up reservoirs and dams.
- Improve irrigation and make use of drip irrigation.

#### **Impacts of drought**

##### Economic

##### Costs and losses to agricultural producers

- Annual and perennial crop losses
- Damage to crop quality
- Income loss for farmers due to reduced crop yields
- Reduced productivity of crop land (wind erosion, long-term loss of organic matter, etc.)
- Insect infestation
- Plant disease
- Wildlife damage to crops
- Increased irrigation costs

#### **BEFORE THE STORM**

Depending on the weather, forecast and other conditions, we may pre-treat major hills and roads with sand to prevent the snow and ice from bonding to the road surface.

#### **HOW TO PREDICT SNOW**

- **Listen to weather alerts and warnings** form the South Africa Weather Services and your local Disaster Management Centre.
- **Watch the skies** - If you notice that the air is colder and the clouds look like rain clouds (normal clouds but ones that are grey) but are hanging lower in the sky than usual, than you can usually expect snow within the next few days.
- **Watch animals** -Animals seem to be very good at predicting the weather. For an easy way into the sciences of weather, just watch them. The birds tend to huddle together on power-lines and tree branches. They also fly lower because of the low clouds. Animals often become very still and quiet right before a snowfall so listen for silence. If it sounds unusually quiet (dog's not barking, chipmunks quiet, birds not singing) then bundle up.
- **Watch the weather channel** - It's the easiest and most used method. Watch the news or the weather network. You can watch it on TV, find it online or hear from radio stations.
- **Watch for a halo around the moon** - Have you ever seen a halo around the moon or even sometimes around the sun? What happens is that clouds that contain ice crystals (possibly snow clouds) form a layer. The ice crystals form light prisms that can be seen sometimes as a white or sometimes a coloured halo around the sun or the moon.
- **Feel the change in wind direction** - If you have already noticed that the clouds are low or that it is getting chillier, pay attention to which direction the winds are blowing. If you notice a change in the direction of the wind you can usually expect a change in weather. If the wind is blowing from the south or the east it often means that the weather going to get worse.

#### **DURING THE STORM**

Depending on forecast and conditions, sanding will continue throughout the storm. Town plows will begin to plow major roads after approximately two inches of snow accumulation. Private plow contractors will begin to plow secondary and minor roads after approximately three inches of snow accumulation.

#### **SAFETY PRECAUTIONS**

##### **Snowstorm Safety Tips**

Be prepared when the snow hits the region by paying attention to the following health and safety precautions for children and adults alike:

- Dress warmly in loose-fitting layers of clothing, wearing a hat, scarf, boots, gloves, and ear-muffs or a head band. This will protect you against frostbite and hypothermia - the dangerous lowering of body temperature, which are the two most common health problems caused by cold-weather exposure.
- Clear snow and ice from your sidewalk to make it safe for your family and neighbours.
- Shovelling snow, particularly when it's wet and heavy, is a strenuous and extremely dangerous activity for anyone who is not physically fit. People with a history of heart disease or high blood pressure should especially avoid shovelling snow.
- Snow-blowers are an easier and more efficient method of snow removal but must be used carefully. Shut the engine off and wait for all moving parts to stop before unclogging the discharge chute. Use a stick, not your hands or feet, to remove obstructions. Always clear the area first of objects under the snow that might be picked up and thrown.
- Avoid injuries from sledding or snowboarding by selecting a slope free of obstacles such as fences, stumps, rocks, logs and other objects that may be hidden under the snow. Make sure the slope is snow-packed, not icy, with a long flat runoff for safe and smooth stopping.
- Never snowboard in a head-first position, in the street or anywhere near traffic. Never hitch a ride to a moving car or other vehicle.
- Wearing a helmet reduces the risk of serious head injury in a fall or mishap and is recommended for sledding, skating, skiing and other such recreational activities.
- Listen to your body. If you experience any shortness of breath, dizziness, or chest discomfort, stop immediately and seek medical care.
- Drink plenty of water so that you're well hydrated. Don't drink caffeine or alcohol, or use nicotine products immediately before shovelling.
- Equip your car for driving in snowy conditions. That means cleaning snow off the car before you start driving, making sure your windshield wipers work well, clearing off your headlights, and using snow tires or chains if you need them. And stock your trunk with a shovel, tow rope, ground sheet (for fitting chains), rubber gloves, plastic ice scraper, blanket, and flashlight.

#### **WHAT TO DO WHEN IT STOPPED SNOWING**

There are things you can do to help prevent potential hazards caused by large amounts of snow on your roof and around your property. Melting snow especially presents potential hazards for flooding that you should watch for.



## NATIONAL DISASTER MANAGEMENT CENTRE

### SNOW AWARENESS

#### WHAT IS SNOW?

Snow is made of tiny crystals of frozen water vapour. Lots of ice crystals joined together makes a snowflake. Snowflakes come in all different shapes, and no two snowflakes are ever exactly the same. It usually snows in August and winter.

#### WHICH SOUTH AFRICAN REGIONS ARE AFFECTED BY SNOW?

The areas that are mostly affected by snow in South Africa are the Eastern Cape, KwaZulu-Natal, Free State, Western Cape and the Lesotho Mountains.


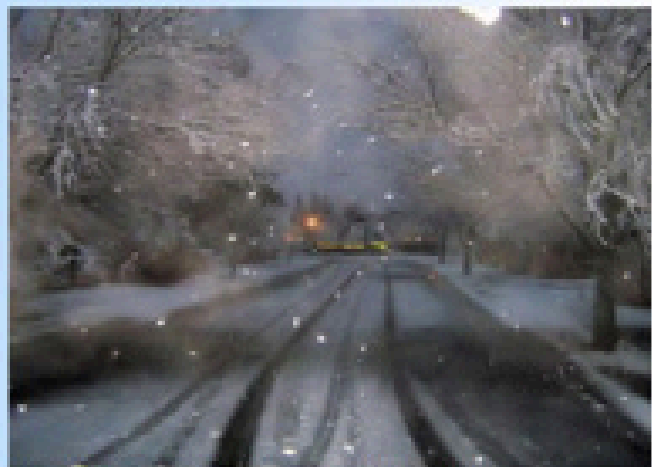
#### HOW SNOW IS FORMED?

Snow forms at temperatures below zero Degrees Celsius. It begins in the atmosphere as water condenses into tiny droplets. As more and more water vapour condenses onto its surface, the droplets grow. Cold air then freezes this water into an ice crystal.

Each ice crystal has a unique shape that depends on the surrounding air's temperature and water vapour content. If it is below freezing and there is a lot of water vapour in the air. More and more water vapour collect on these branches and freeze, making the ice crystal increasingly heavy. Eventually, the ice crystal falls from the sky, leaving the cloud of precipitation that it helped to form. As it falls, the crystal continues to grow by picking up more water vapour.

As it descends, the ice crystal can come into contact with warmer air that makes it melt somewhat. This melting act like a glue, causing crystals to bond together into larger flakes, forming what many people think of as the "classic" fluffy snowflake. If the crystals melt too much and then refreeze as they get closer to Earth's surface, the precipitation falls as sleet instead of snow.

Once on the ground, snow will remain if temperatures are cold enough to keep it from melting. Glaciers that form on mountains, for example, are made up of snow that accumulates on the ground and eventually turns to ice.

USES OF SNOW	SNOW CAN BE DANGEROUS
<p>Snow has many uses in nature. A thick layer of snow does not allow heat to escape from the ground beneath it. It works like a blanket to save plants and animals from the damage caused by freezing temperatures. Although it may be cold above the ground, snow is a good insulator, and keeps the heat underground in. It is because snow keeps heat in that many Eskimos and Arctic explorers build igloos of snow blocks.</p> <p>Snow is also a very useful source of water supply, especially in hot, dry countries. Deep layers of snow on high mountains will not melt until late spring or early summer. Rivers like the Nile in Africa, and the Indus in India, would dry up in hot weather without supplies of melting snow. Another use of snow is all the fun you can have when the ground is covered in snow.</p>	<p>Snow can be dangerous for farm animals when it is very heavy, and difficult to walk through. It covers the food they eat and freezes the water.</p> <p>Snow is dangerous for traffic when it piles up on the roads. It can be very dangerous as an avalanche. People have been killed by avalanches. Snow can also reduce traffic visibility.</p> <p>Road closures caused by heavy snowfall can have high economic costs. When a road closes, it diverts travelers away from businesses on or near that road. The closure of a road also causes delays for drivers who are going to work or delivering freight. One less accessible road can adversely affect the entire community.</p>
 <p>Snow in Clarens Free State, 2011</p>	 <p>Snow in Queenstown Eastern Cape, 25 July 2011</p>

- Cost of new or supplemental water resource development (wells, dams, pipelines)

#### Costs and losses to livestock producers

- Reduced productivity of grazing land
- Reduced milk production
- Forced reduction of foundation stock
- Closure/limitation of public lands to grazing
- High cost/unavailability of water for livestock
- Cost of new or supplemental water resource development (wells, dams, pipelines)
- High cost/unavailability of feed for livestock
- Increased feed transportation costs
- High livestock mortality rates
- Disruption of reproduction cycles (delayed breeding, more miscarriages)
- Decreased stock weights
- Increased predation
- Veld fires

#### Loss from timber production

- Veld and forest fires
- Tree disease
- Insect infestation
- Impaired productivity of forest land
- Direct loss of trees, especially young ones

#### Loss from fishery production

- Damage to fish habitat
- Loss of fish and other aquatic organisms due to decreased flows

#### General economic effects

- Decreased land prices
- Loss to industries directly dependent on agricultural production (e.g., machinery and fertiliser manufacturers, food processors, dairies, etc.)
- Unemployment from drought-related declines in production
- Strain on financial institutions (foreclosures, more credit risk, capital shortfalls)
- Revenue losses to national, provincial, and local governments (from reduced tax base)
- Reduction of economic development
- Fewer agricultural producers (due to bankruptcies, new occupations)
- Rural population loss

#### Loss to recreation and tourism industry

#### Loss to manufacturers and sellers of recreational equipment

- Losses related to curtailed activities: hunting and fishing, bird watching, boating, etc.

#### Energy-related effects

- Increased energy demand and reduced supply because of drought-related power curtailments
- Costs to energy industry and consumers associated with substituting more expensive fuels (oil for hydroelectric power)
- Water Suppliers

#### Revenue shortfalls and/or windfall profits

- Cost of water transport or transfer
- Cost of new or supplemental water resource development

#### Decline in food production/disrupted food supply

- Increase in food prices
- Increased importation of food (higher costs)

#### **Environmental**

#### Damage to animal species

- Reduction and degradation of fish and wildlife habitat
- Lack of feed and drinking water
- Greater mortality due to increased contact with agricultural producers, as animals seek food from farms and producers are less tolerant
- Disease
- Increased vulnerability to predation (from species concentrated near water)
- Migration and concentration (loss of wildlife in some areas and too many in others)
- Increased stress to endangered species
- Loss of biodiversity

#### Hydrological effects

- Lower water levels in reservoirs, lakes and dams
- Reduced flow from springs
- Reduced stream flow
- Loss of wetlands
- Estuarine impacts (e.g., changes in salinity levels)
- Increased ground water depletion, land subsidence, reduced recharge
- Water quality effects (e.g., salt concentration, increased water temperature, pH, dissolved oxygen, turbidity)

#### Damage to plant communities

- Loss of biodiversity
- Loss of trees from urban landscapes, green belts, wooded conservation areas
- Increased number and severity of fires
- Wind and water erosion of soils, reduced soil quality
- Air quality effects (e.g., dust, pollutants)
- Visual and landscape quality (e.g., dust, vegetative cover, etc.)

#### **Social**

#### Health

- Mental and physical stress (e.g., anxiety, depression, loss of security, domestic violence)
- Health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations, reduced fire fighting capability, etc.)
- Reductions in nutrition (e.g., high-cost food limitations, stress-related dietary deficiencies)
- Loss of human life (e.g., from heat stress, suicides)
- Public safety from forest and range fires
- Increased respiratory ailments
- Increased disease caused by wildlife concentrations

#### Increased conflicts

- Water user conflicts
- Political conflicts
- Management conflicts
- Other social conflicts (e.g., scientific, media-based)

#### Reduced quality of life, changes in lifestyle

- In rural areas
- In specific urban areas
- Increased poverty in general
- population migrations (rural to urban areas, migrants into South Africa)
- loss of aesthetic values

- reduction or modification of recreational activities
- Disruption of cultural belief systems (e.g., religious and scientific views of natural hazards)
- Re-evaluation of social values (e.g., priorities, needs, rights)
- Public dissatisfaction with government drought response
- Perceptions of inequity in relief, possibly related to socio-economic status, ethnicity, age, gender, seniority
- Loss of cultural sites
- Increased data/information needs, coordination of dissemination activities
- Recognition of institutional restraints on water use

NATIONAL DISASTER MANAGEMENT CENTRE

## SNOW AWARENESS



- Don't handle fishing rods, umbrellas or golf clubs etc.
- Don't ride horses, cycles or drive in open vehicles.
- If driving, slow down or park away from trees, power lines etc. Stay inside metal-bodied (hard top) vehicles or caravans but don't touch any metal sections.
- If swimming, surfing etc, leave the water immediately.
- If boating, go ashore to shelter as soon as possible. (A bridge or high jetty may offer immediate protection.)
- Be sure the mast and stays of a sailing boat are adequately 'grounded' to the water.

#### *What if I am indoors?*

- Before the storm arrives, disconnect external aerial and power leads to radios and television sets.
- Disconnect computer modems and power leads.
- Draw all curtains and keep clear of windows, electrical appliances, pipes and other metal fixtures (e.g. don't take a bath or shower).
- Avoid use of telephones. In emergencies, make calls brief. (Don't touch any metal, brick or concrete) and don't stand bare foot on concrete or tiled floors.

#### *What should I do if someone is struck by lightning?*

- Apply immediate heart massage and mouth-to-mouth resuscitation to lightning victims until medical help arrives and they will have a good chance of survival. (You won't receive a shock from the victim.)

#### *Facts about lightning:*

- When struck, people do not glow or 'fry to crisp' but the heart and breathing are often affected.
- Only about 30% of people struck, actually die, and the incidence of long term disability is low, particularly when first-aid is applied promptly.
- If your clothes are wet, you are less likely to be seriously injured if struck, as most of the charge will conduct through the wet clothes rather than your body.
- Average lightning bolts carry a current of 10, 000 to 30, 000 amps. An average radiator draws 10 amps.
- Lightning can, and often does, strike more than once in the same place.
- Worldwide, thunderstorms are producing approximately 6,000 lightning strikes every minute!



NATIONAL DISASTER MANAGEMENT  
VELD FIRE AWARENESS



## NATIONAL DISASTER MANAGEMENT CENTRE VELD FIRE AWARENESS

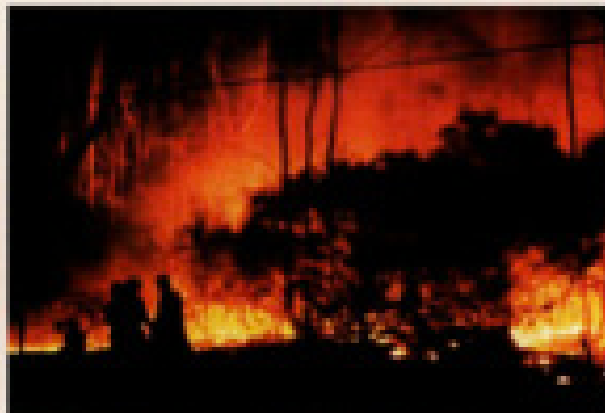


PHOTO: COURTESY OF ORRUMBA

### What are veld and forest fires?

All veld and forest fires are dealt with under the National Veld and Forest Fires Act (No. 103 of 1998). This law defines a veld fire as a "veld, forest or mountain fire, where veld means the open countryside beyond the urban limit or homestead boundary". Veld fires are therefore any fire which occurs outside the boundaries of urban built areas and pose the potential of running out of control.

About 90% of veld fires are started by humans; the other 10% are started by natural occurrences such as lightning.

Three components are necessary to start a veld fire: oxygen, fuel and heat.

- At least 15 percent oxygen must be in the air for a fire to start (our atmosphere contains 21%).
- Fuel is any living or dead material that will burn. Fuels such as dead plants, dry leaves, pine needles and grass burn more readily than moist green plants because the dead material contains less moisture.
- Heat is usually supplied by a lightning strike to a tree or dry grass. People normally start veld fires through carelessness (not properly disposing of cigarette butts) or malicious (intentionally starting a fire) behaviour.

### How do I know that a veld fire might occur?

- It is normally your dry season.
- You experience very hot conditions.
- There are a lot of potential fuel (e.g. dry leaves, wood, dead plants and grass).
- You can clearly see long dry grass and plants.
- There are moderate to strong winds present.

### Why are veld fires important?

Environmentally veld fires can be important to local ecosystems. e.g. smoke and heat are sometimes needed for seeds to germinate.

Veld fires can lead to regeneration of local plant life.

Veld fires can have a economic and emotional effect on people and property directly affected.

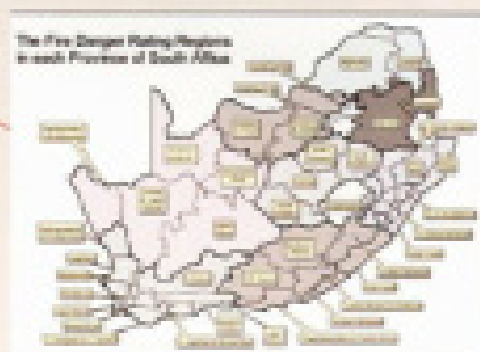
Having a better understanding of veld fire causes can help you better prepare and perhaps minimise or prevent veld fire damage.

### Did you know?

Veld fires are actually naturally stored solar energy that is out of control? That's because trees convert all that sunlight into oils that get stored in leaves that end up burning like petrol.

### Fire warnings

The South African Department of Water Affairs and Forestry (DWAF) developed a Fire Danger Rating which aims to increase the capacity of the general public and Fire Protection Associations to manage veld and forest fires by being aware of the likelihood of fires occurring in a given area at a given time.



## National Disaster Management Centre

### Lightning AWARENESS

#### What is lightning?

Lightning is one of the most beautiful displays in nature. It is also one of the most deadly natural phenomena known to humans. With bolt temperatures hotter than the surface of the sun and shock waves beaming out in all directions, lightning is a lesson that commands the respect of humankind.

Lightning occurs with every thunderstorm (see the National Disaster Management Centre's awareness brochure on "Thunderstorms") and must be expected as soon as thunderstorms form. Lightning results from the build-up and discharge of electrical energy between positively and negatively charged areas in the atmosphere and clouds. The most lightning occurs between clouds but it is the ground strikes that are dangerous.

#### What types of lightning do we get?

##### Cloud to Ground

Cloud-to-ground lightning is the most damaging and dangerous form of lightning. It is not the most common type, but it is the one that is best understood. Most cloud-to-ground lightning strikes come from the negatively charged bottom of the cloud travelling to the positively charged ground below. Some cloud-to-ground lightning strikes deliver positive charges to the ground. Positive strikes are less common and come from the higher regions of the thundercloud. Often, cloud-to-ground lightning bolts strike the highest object, like the top of a building or the top of a tall tree. The lightning strikes can cause fire and property damage. If a person is the highest object in the lightning bolt's path, the lightning may strike the person. Lightning strikes can cause severe injury or death. Cloud-to-ground lightning is the best understood type of lightning because it leaves so much evidence behind.

##### Intra cloud

Intra-cloud lightning is the most common type of lightning. This occurs between oppositely charged centres within the same cloud. This means that there are both positive and negative charges within the same cloud. Usually the process takes place within the cloud and looks like a bright flash of light which flickers. This bright flash may leave the cloud and the flash can be visible for many kilometres.

##### Inter cloud

A less common lightning strike occurs between oppositely charged areas of different clouds. This means that there are positive and negative charges within different clouds and the strike travels in the air between them. This type of lightning is known as inter-cloud lightning.

#### How do I know that lightning might occur?

- You can observe thundercloud formation.
- You can hear the rumble in the clouds and notice the flashes when intra-cloud lightning occurs.
- You can count the time it takes to hear the thunder after seeing the flash (divide the number of seconds by 3 to find out how many kilometres away the flash was; Once you see the the flash of lightning start counting. Stop immediately after you hear the thunder (e.g. you have counted 9 seconds) and divide the number of seconds you counted by three (9 divided by 3 is 3). That is the amount of kilometres the thunderstorm is away from you (3 km).

#### Two key observations when lightning might strike:

1. Thunderclouds form
2. Intra-cloud flashes

### Lightning warnings

Warnings of possible thunderstorms and its accompanying lightning strikes are normally communicated by your local weather office or disaster risk management centre. If you think lightning strikes might occur in your area be sure to regularly listen to the radio and/or watch the weather forecast on TV. A warning is only as good as your reaction to it!

### IMPORTANT:

Always obey and react to early warnings from your local disaster risk management centre!

#### What should I do in order to reduce my risk of lightning strike?

- If you live in a thatched building erect a lightning conductor near to but not touching the building.
- Stay indoors during a thunderstorm and if you are travelling, stay in the vehicle.
- When indoors stay away from windows, do not hold any metal object nor use any electrical appliance.
- Do not use the telephone.
- Do not take a bath or shower during the storm.
- If you are caught in the open, seek shelter in a building.
- Avoid hilltops and do not shelter under lone trees nor in isolated sheds.
- Keep your distance from fences, telephone or power lines and steel structures such as pylons and windmills.
- Do not swim during a thunderstorm and seek shelter if you are in a boat.
- If you are in the open playing sport, seek shelter especially if you are fishing, or playing golf, soccer or rugby.

#### What if I am outdoors?

- If you hear thunder 9 seconds after a lightning flash, it is only about three kilometres away. The shorter the time, the closer the lightning, so find shelter urgently as follows:
- Seek shelter in a 'hard top' vehicle or solid building – avoid small structures or fabric tents.
- Never shelter under small groups of (or single) trees.
- If far from shelter, crouch (alone, feet together) preferable in a hollow. Remove metal objects from head/body.
- Don't lie down (avoid being highest object).
- If your hair stands on end or you hear 'buzzing' on nearby rocks, fences, etc, move immediately. At night, a blue glow may show if an object is about to be struck.
- Don't fly kites or model planes with control wires.

# NATIONAL DISASTER MANAGEMENT LIGHTNING AWARENESS



## Fire Danger Rating

The national system is designed to apply in 42 distinct regions (see map above) each with different fire conditions. Within each region data relating to flammable fuel structure and condition (fuel models) must be specified, together with daily forecast weather data, for inputting to the fire danger model. This model is used to calculate daily forecast Fire Danger Index values. The forecast indices of fire danger are then entered into a Fire Danger Rating Table. The table classifies fire danger rating five categories:

1. When the danger rating is insignificant (blue), the fire danger is so low that no precaution is needed.
2. When the rating is low (green), fires including prescribed burns may be allowed in the open air on the condition that persons making fires take reasonable precautions against fires spreading.
3. When the rating is moderate (yellow), the fire danger is such that no fires may be allowed in the open air except those that are authorised by the Chief Fire Officer of the local fire service and those in designated fireplaces; authorised fires may include prescribed burns.
4. When the rating is high (orange), the fire danger is such that no fires may be allowed under any circumstances in the open air.
5. When the rating is extreme (red), the fire danger is such that no fires may be allowed under any circumstances in the open air, and special emergency fire preparedness measures must be invoked.



Fire danger ratings are communicated to Fire Protection Associations and Chief Fire Officers.

The main contributor to veld fires is human negligence!

Warnings of possible veld fires are normally communicated by your local weather office or disaster risk management centre. If you think a veld fire might occur in your area be sure to regularly listen to the radio and/or watch TV. Also be aware of local disaster risk management officials making neighbourhood calls through loud speakers. A warning is only as good as your reaction to it!

## IMPORTANT:

Always obey and react to early warnings from your local disaster risk management centre!

## Precautions to veld fires

Certain short-, medium-, and long-term measures can be taken to ensure that we lessen the possibility of veld and forest fires.

## Firebreaks

A firebreak is a strip of land where vegetation has been removed or modified to contain or to reduce the spread and intensity of any veld fire that may occur in or enter a property.

## When is a firebreak necessary?

Landowners are required to prepare firebreaks on their side of the boundary where there is a reasonable risk of veldfire. How do we know what a reasonable risk is? The courts use the "reasonable person test":

- if a reasonable person in the position of the landowner would foresee that by not preparing a firebreak, a veld fire could start or spread across his or her land, causing harm to someone else,
- and therefore would prepare one,
- then the landowner should also prepare one.

## Removing alien plants

One of the main contributors to veld fires in South Africa is the presence of alien plants. The DWWF has embarked on various projects to curb alien plant invasions through the Ukusuka Fire Stop Programme. Through this programme alien plant species are removed which contributes to more soil moisture and less fuel that can burn.

## What should I do to reduce my risk of veld fire?

How can prevent a fire from affecting your home and family.

- If possible, make firebreaks around your home (use mower, spade, rake), trim branches well clear of the house. Clear roof and gutters of leaves, twigs, etc.
- Remove all rubbish, leaf litter and shrubs growing too close to house. Keep grass short and green.
- Fit wire screens to doors, windows, vents, and enclose all gaps, roof eaves and the area under your house.
- Keep a ladder handy for roof access (inside and outside) and fit hoses to reach all parts of the house and garden. If water is not connected, obtain a high pressure pump.
- Store wood, fuel, paints, etc well clear of the house.
- If possible, check you have adequate insurance cover for veld fire.
- Decide on a household plan to either leave early or stay to protect your home during a veld fire.



Photo: Courtesy of DWWF

### *What should I do if a veld fire is imminent?*

#### **Leave or Protect?**

- If you prepare as noted above, unless you have decided to leave early or are ordered by authorities to do so, stay in the house after taking these extra precautions:
- Phone the Disaster Risk Management office in your municipality-don't assume they know.
- Turn off gas and power. Close all external windows and doors, and block gaps from inside with wet towel.
- Fill baths, sinks, buckets, etc with water.
- Plug downpipes with rags and fill gutters with wet water.
- Remove curtains and furniture away from windows.
- Wear long, woollen or heavy cotton clothing, solid boots or shoes, a hat or woollen balaclava, and gloves.
- Hose down wall, garden etc on sides facing the fire and watch for spot fires from flying sparks or embers.
- When the main fire-front arrives go inside, away from windows, while it passes (usually 3 to 15 minutes).
- Quickly extinguish any fires, which may have started in, near, or under the house or roof. Check inside roof too.
- If the house is alight and can't be extinguished, move away onto burnt ground.
- Don't leave- wait for help.
- Listen to (battery) radio for official information.

### *What if I am caught in a fire while driving?*

- Don't drive into or near veld fires. If caught in a veld fire don't drive through flames or thick smoke.
- Stop at a clearing or roadside in a low vegetation area. Turn ignition off, and hazard lights and headlights on.
- Stay inside unless near shelter. Keep vents, windows and doors closed. Lie inside, below window level, under a woollen blanket until fire front passes.
- After the main fire passes, if heat or fumes inside become severe, get out and move to already burnt ground, keeping your whole body covered.
- The petrol tank is unlikely to explode in the period you need to stay in the car while being shielded from the deadly radiant heat of the fire-front.

### *What if I am on foot?*

#### **Find shelter**

- Don't panic – cover all exposed skin.
- Move across-slope, away from the fire-front, then down-slope towards the rear of the main fire.
- Find open, or already burnt ground. Don't try to out-run fire, or go uphill, or even through low flames, unless you can clearly see a safe area close by.
- If you can't avoid the fire, lie face down under a bank, rock, loose soil, or in a hollow, or if possible get into a dam or stream, but not a water tank.

- Stay out of any building if flood waters remain around the building. Flood waters often undermine foundations, causing sinking, floors can crack or break and buildings can collapse.
- Avoid entering ANY building (home, business, or other) before local officials have said it is safe to do so. Buildings may have hidden damage that makes them unsafe. Gas leaks or electric or water-line damage can create additional problems.
- Report broken utility lines to the appropriate authorities. Reporting potential hazards will get the utilities turned off as quickly as possible, preventing further hazard and injury. Check with your local municipality now about where broken lines should be reported.

flood waters. Some canned foods may be salvageable. If the cans are dented or damaged, throw them away. Food contaminated by flood waters can cause severe infections.

- If water is of questionable purity, boil or add bleach, and distil drinking water before using. Wells or boreholes inundated by flood waters should be pumped out and the water tested for purity before drinking. Ill health effects often occur when people drink water contaminated with bacteria and germs.
- Service damaged septic tanks, cesspools, pits, and leaching systems as soon as possible. Damaged sewage systems are health hazard



### What should I do if flooding is imminent?

- Listen out for warnings on radio and TV and phone your local disaster risk management centre or weather office should you require more information.
- Move pets, vehicles, valuables and other items to safety.
- Alert your neighbours, particularly the elderly, female and child-headed households and people with special needs.
- Be ready to turn off electricity and gas (get help if needed). Unplug electrical items and move them to a higher place.
- Co-operate with emergency services and local authorities - you may be evacuated to a central assembly point.
- Do as much as you can in daylight. Doing anything in the dark will be a lot harder, especially if the electricity fails.
- Never try to swim through fast flowing water - you may get swept away or be struck by an object in the water.
- Don't walk on sea defences, riverbanks or cross river bridges if possible - they may collapse in extreme situations or you may be swept off by large waves. Beware of stones and pebbles being thrown up by waves.
- Avoid contact with floodwater - it may be contaminated with sewage.

- Develop an evacuation plan.
- Discuss floods with your family.

### What should I do during a flood ?

- Listen continuously to the radio or television for updated emergency information. Local stations provide you with the best advice for your particular situation.
- Everyone in an area should be ready to respond and act quickly. Floods and flash floods can happen quickly and without warning. Be ready to act immediately.
- Be alert to signs of flooding, and if you live in a flood-prone area, be ready to evacuate at a moment's notice. Floods can happen quickly and you may need to leave with little or no notice.
- Follow the instructions and advice of local authorities. Local authorities are the most informed about affected areas. They will best be able to tell you areas to avoid.
- If you live in a flood-prone area or think you are at risk, evacuate immediately. Move quickly to higher ground. Save yourself, not your belongings. The most important thing is your safety.
- If advised to evacuate, do so immediately. Move to a safe area before access is cut off by flood water. Evacuation is much simpler and safer before flood waters become too deep for vehicles to drive through.
- Follow recommended evacuation routes. Shortcuts or alternate, non-recommended routes may be blocked or damaged by flood waters.
- Leave early enough to avoid being marooned by flooded roads. Delaying too long may allow all escape routes to become blocked.

### What should I do after a flood?

- Seek necessary medical care at the nearest hospital or clinic. Contaminated flood waters lead to a greater possibility of infection. Severe injuries will require medical attention.
- Help a neighbour who may require special assistance - infants, elderly people, and people with special needs. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
- Avoid disaster areas. Your presence might hamper rescue and other emergency operations, and put you at further risk from the residual effects of floods, such as contaminated waters, crumbled roads, landslides, mudflows, and other hazards.
- Continue to listen to the local radio or television stations and return home only when authorities indicate it is safe to do so. Flood dangers do not end when the water begins to recede; there may be flood-related hazards within your community, which you could hear about from local broadcasts.

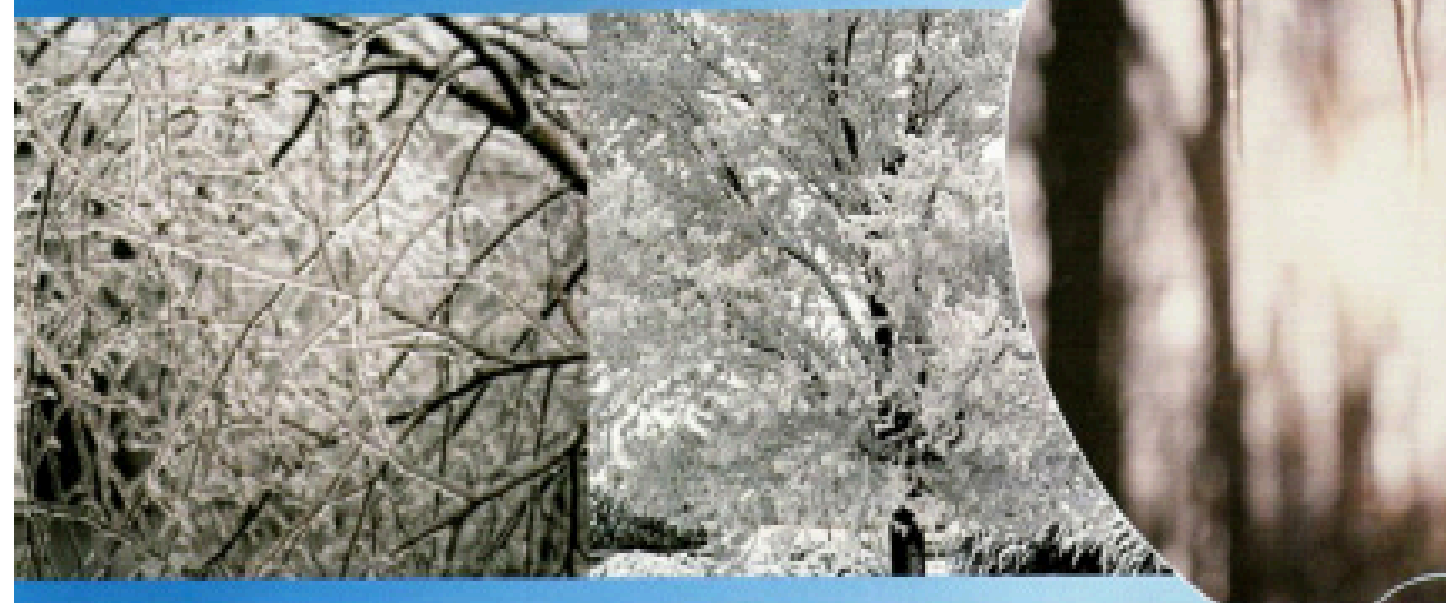
### What if I am on the road?

- Never attempt to cross the flooded river with or without a vehicle.
- Never drive through the bridge when the bridge is submerged into water.
- Avoid open and partially closed storm water drainage system.

### How do I safeguard myself and my family?

- Regardless of how a flood occurs, the rule for being safe is simple: head for higher ground and stay away from flood waters.
- If you come upon flood waters, stop, turn around, and go another way. Climb to higher ground.
- Stay away from flooded areas. Even if it seems safe, flood waters may still be rising.
- Never try to walk, swim, drive, or play in flood water.
- If you are in a vehicle and become surrounded by water, if you can get out safely, do so immediately and move to higher ground.
- Watch out for snakes in areas that were flooded.
- Stay away from stream banks in flooded and recently flooded areas.
- Never play around high water, storm drains, ditches, ravines, or culverts.
- Throw away all food that has come into contact with flood waters - the water might well be contaminated and unsafe.

## NATIONAL DISASTER MANAGEMENT EXTREME COLD AWARENESS



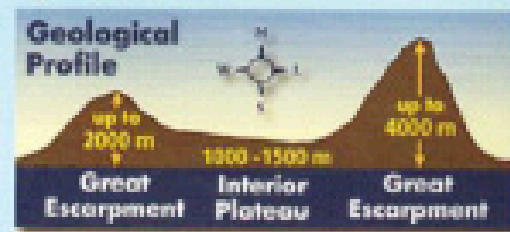
## extreme cold AWARENESS

### What is extreme cold?

What constitutes extreme cold and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." Whenever temperatures drop decidedly below normal and as wind speed increases, heat can leave your body more rapidly. These weather related conditions may lead to serious health problems. Extreme cold is a dangerous situation that can bring on health emergencies in susceptible people, such as those without shelter or who are stranded, or who live in a home that is poorly insulated or without heat.

### Which regions are affected by extreme cold?

Almost all areas in South Africa are susceptible to extreme cold during different times of the year. It is in particular the high-lying areas (called the Great Escarpment) in the Eastern (and also Western) Cape, Drakenberg and Lesotho mountains which regularly experience severe snow falls and its accompanying extreme cold conditions. This is mostly due to its height above sea level and the prevalence of conditions suitable for cold conditions.



### How do I know that I might experience extreme cold conditions?

The development of a extreme cold conditions requires cold air, moisture, and lift.

- **Cold air:** Subfreezing temperatures (below 0°C) in the clouds and/or near the ground are needed to make snow and/or ice.
- **Moisture:** The air must contain moisture in order to form clouds and precipitation. Air blowing across a body of water, such as a large dam or an ocean, is an excellent source of moisture.
- **Lift:** A mechanism to raise the moist air to form the clouds and cause precipitation must be present. Lift may be provided by any or all of the following:
  - The flow of air up a mountainside;
  - Fronts, where warm air collides with cold air and rises over the cold dome; and
  - Upper-level low pressure troughs.

### How can I prepare myself for extreme cold?

- Listen to your radio and television, for weather reports and emergency information.
- Eat regularly and drink ample fluids, but avoid caffeine and alcohol.
- Avoid overexertion when working in cold conditions. Overexertion can bring on a heart attack — a major cause of death in the winter. If you must work outside, stretch before starting your work.
- Watch for signs of frostbite.
- Watch for signs of hypothermia.
- Conserve fuel, if necessary, by keeping your residence cooler than normal.
- Temporarily close off heat to some rooms.
- Maintain ventilation when using paraffine heaters to avoid build-up of toxic fumes.
- Refuel paraffine heaters outside and keep them at least one metre away from flammable objects.

### What should I do if flooding is imminent?

- Listen out for warnings on radio and TV and phone your local disaster risk management centre or weather office should you require more information.
- Move pets, vehicles, valuables and other items to safety.
- Alert your neighbours, particularly the elderly, female and child-headed households and people with special needs.
- Be ready to turn off electricity and gas (get help if needed). Unplug electrical items and move them to a higher place.
- Co-operate with emergency services and local authorities - you may be evacuated to a central assembly point.
- Do as much as you can in daylight. Doing anything in the dark will be a lot harder, especially if the electricity fails.
- Never try to swim through fast flowing water - you may get swept away or be struck by an object in the water.
- Don't walk on sea defences, riverbanks or cross river bridges if possible - they may collapse in extreme situations or you may be swept off by large waves. Beware of stones and pebbles being thrown up by waves.
- Avoid contact with floodwater - it may be contaminated with sewage.

### What if I am on the road?

- Never attempt to cross the flooded river with or without a vehicle.
- Never drive through the bridge when the bridge is submerged into water.
- Avoid open and partially closed storm water drainage system.

### How do I safeguard myself and my family?

- Regardless of how a flood occurs, the rule for being safe is simple: head for higher ground and stay away from flood waters.
- If you come upon flood waters, stop, turn around, and go another way. Climb to higher ground.
- Stay away from flooded areas. Even if it seems safe, flood waters may still be rising.
- Never try to walk, swim, drive, or play in flood water.
- If you are in a vehicle and become surrounded by water, if you can get out safely, do so immediately and move to higher ground.
- Watch out for snakes in areas that were flooded.
- Stay away from stream banks in flooded and recently flooded areas.
- Never play around high water, storm drains, ditches, ravines, or culverts.
- Throw away all food that has come into contact with flood waters - the water might well be contaminated and unsafe.

- Develop an evacuation plan.
- Discuss floods with your family.

### What should I do during a flood ?

- Listen continuously to the radio or television for updated emergency information. Local stations provide you with the best advice for your particular situation.
- Everyone in an area should be ready to respond and act quickly. Floods and flash floods can happen quickly and without warning. Be ready to act immediately.
- Be alert to signs of flooding, and if you live in a flood-prone area, be ready to evacuate at a moment's notice. Floods can happen quickly and you may need to leave with little or no notice.
- Follow the instructions and advice of local authorities. Local authorities are the most informed about affected areas. They will best be able to tell you areas to avoid.
- If you live in a flood-prone area or think you are at risk, evacuate immediately. Move quickly to higher ground. Save yourself, not your belongings. The most important thing is your safety.
- If advised to evacuate, do so immediately. Move to a safe area before access is cut off by flood water. Evacuation is much simpler and safer before flood waters become too deep for vehicles to drive through.
- Follow recommended evacuation routes. Shortcuts or alternate, non-recommended routes may be blocked or damaged by flood waters.
- Leave early enough to avoid being marooned by flooded roads. Delaying too long may allow all escape routes to become blocked.

### What should I do after a flood?

- Seek necessary medical care at the nearest hospital or clinic. Contaminated flood waters lead to a greater possibility of infection. Severe injuries will require medical attention.
- Help a neighbour who may require special assistance - infants, elderly people, and people with special needs. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
- Avoid disaster areas. Your presence might hamper rescue and other emergency operations, and put you at further risk from the residual effects of floods, such as contaminated waters, crumbled roads, landslides, mudflows, and other hazards.
- Continue to listen to the local radio or television stations and return home only when authorities indicate it is safe to do so. Flood dangers do not end when the water begins to recede; there may be flood-related hazards within your community, which you could hear about from local broadcasts.

### What are floods?

Flood refers to excessive water run-off or the rise in water level in a particular area which is more than the particular environment can absorb or carry. Floods can be caused by either too much rain in a short space of time (for example cloud bursts), continuous rain in the same area, blockages in rivers and streams (such as rubble or landslides), failure in dam walls and levies, storm surges (for instance, waves being driven ashore by strong winds) or the excessive release of water from dams and lakes. It is normally the prolonged period of rainfall which gives us a good indication of a possible flood.

### What types of floods do we get?

#### Riverine flooding

Flooding along rivers is a natural and inevitable part of life. Some floods occur seasonally with summer (northern parts of South Africa) or winter (southern parts of South Africa) rainfall which causes river basins to fill with too much water, too quickly. Torrential rains from tropical cyclones (also called hurricanes and typhoons) can also produce river flooding (as was the case in the 2000 floods in Mozambique and the northern parts of South Africa).

#### Coastal floods

Winds generated from tropical storms and cyclones or intense offshore low pressure systems can drive ocean water inland and cause significant flooding (in coastal zones or in river deltas and floodplains). Escape routes can be cut off and blocked by high water. Coastal flooding can also be produced by sea waves called tsunamis, sometimes referred to as tidal waves (as was the case in the 2004 East-Asia tsunami disaster).

#### Urban floods

Our urban development creates a number of areas which cannot absorb natural rainfall (for example: parking lots, roads, buildings etc.). Urbanisation increases runoff 2 to 6 times over what would occur on natural terrain. During periods of urban flooding, streets can become swift moving rivers and houses and buildings can sustain damages.

#### Flash floods

Flash floods occur when an excessive amount of rain falls within a short period of time (in dried up streams and - wetlands, river valleys and also urban areas) or when a massive amount of water is suddenly released (by dams or the release of blockages in rivers). Rainwater causes a small but fast moving river which can gain velocity in a matter of minutes. Many areas in South Africa (such as Alexandria in Johannesburg and the Cape Flats in Cape Town) experience annual flash floods.

### How do I know that a flood might occur?

- It is normally your rainy season.

- There are severe inland thunderstorms or storms over the sea.
- Previous rains have saturated the soil and another storm is threatening
- There is excessive rainfall over a short period of time.
- Moderate rainfall occur from slow moving storms resulting in a lot of rain over the same area.
- The ground cannot absorb the amount of water quickly enough.
- The water levels in rivers and dams rise suddenly.
- There might be snow in the mountains which could melt once spring approaches.
- You experience Gail force winds and/or high swells on the coastal areas.
- More and more green areas are developed into urban centres (which decreases the environment's absorption capacity).

### Two key elements which contributes to flooding:

1. Rainfall intensity (the rate of rainfall)
2. Duration (how long the rain lasts)

### Flood warnings

Warnings of possible floods are normally communicated by your local weather office or disaster risk management centre. If you think a flood might occur in your area be sure to regularly listen to the radio and/or watch TV, or contact your nearest weather office. Also be aware of local disaster risk management officials making neighbourhood calls through loud speakers. A warning is only as good as your reaction to it!

#### IMPORTANT:

Always obey and react to early warnings from your local disaster risk management centre!

### What should I do in order to reduce my risk of flooding?

- Be aware of where you build your house or dwelling – avoid high risk areas such as river beds and floodplains.
- Obey the rules and bylaws of your local municipality – they are there for a reason.
- Consult with your local councillor and/or disaster risk management official.
- Become involved as a community disaster risk management volunteer (contact your local disaster risk management centre in this regard – see back of brochure).
- Become a community activist. Speak out if you think that local developments are increasing your risk of flooding.
- Develop a community flood risk management plan with the help of your local disaster risk management centre.

### If you have to go outside...

- Wear several layers of loose fitting, lightweight, warm clothing rather than one layer of heavy clothing.
- The outer garments should be tightly woven and water repellent.
- Wear gloves.
- Wear a hat.
- Cover your mouth with a scarf to protect your lungs.

### Drive only if it is absolutely necessary. If you must drive, consider the following:

- Travel in the day, don't travel alone, and keep others informed of your schedule.
- Stay on main roads; avoid back road shortcuts.

### How do I prepare your home for winter

Although periods of extreme cold cannot always be predicted far in advance, weather forecasts can sometimes provide you with several days' notice. Listen to weather forecasts regularly.

If you plan to use a fireplace, wood stove or paraffin lamps for heating, ensure that it is well ventilated (use a chimney as far as possible).

Your ability to feel a change in temperature decreases with age, and older people are more susceptible to health problems caused by cold. If you are over 65 years old, place an easy-to-read thermometer in an indoor location where you will see it frequently, and check the temperature of your home often during the winter months.

Insulate your dwelling (e.g. windows and doors) as far as possible by making use of newspaper, material or foam.

If you have pets, bring them indoors. If you cannot bring them inside, provide adequate shelter to keep them warm and make sure that they have access to unfrozen water.

### What if I have no heat in my home?

- Close off unneeded rooms.
- Stuff towels or rags in cracks under doors.
- Cover the windows at night.
- Wear layers of loose fitting, light weight, warm clothes.

### Extreme cold warnings

Warnings of extreme cold are normally communicated by your local weather office or disaster risk management centre. If you think extreme cold might occur in your area be sure to regularly listen to the radio and/or watch TV. Also be aware of local disaster risk management officials making neighbourhood calls through loud speakers. A warning is only as good as your reaction to it!

#### IMPORTANT:

Always obey and react to early warnings from your local disaster risk management centre!

### Be aware of the following aspects associated with extreme cold conditions:

#### Frostbite

Frostbite is damage to body tissue caused by that tissue being frozen. Frostbite causes a loss of feeling and a white or pale appearance in extremities, such as fingers, toes, ear lobes, or the tip of the nose. If symptoms are detected, get medical help immediately! If you must wait for help, slowly rewarm affected areas. However, if the person is also showing signs of hypothermia, warm the body core before the extremities.

#### Hypothermia: Low body temperature

The warning signs of hypothermia is uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness, and apparent exhaustion.

Detection - Take the person's temperature. If below 35°C, immediately seek medical care! If medical care is not available, begin warming the person slowly. Warm the body core first. If needed, use your own body heat to help. Get the person into dry clothing, and wrap them in a warm blanket covering the head and neck. Do not give the person alcohol, drugs, coffee, or any hot beverage or food; warm broth is better. Do not warm extremities (arms and legs) first! This drives the cold blood toward the heart and can lead to heart failure.

#### Wind chill

Wind chill is the term used to describe the rate of heat loss on the human body resulting from the combined effect of low temperature and wind. As winds increase, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually internal body temperature. While exposure to low wind chills can be life threatening to both humans and animals alike, the only effect that wind chill has on inanimate objects, such as vehicles, is that it shortens the time it takes the object to cool to the actual air temperature (it cannot cool the object below that temperature). For example, water freezes at 0°C, regardless of what the wind chill temperature is.



The following table is an indication of the influence of wind chill on actual temperature.

Wind chill for temperatures from +5 to -20°C

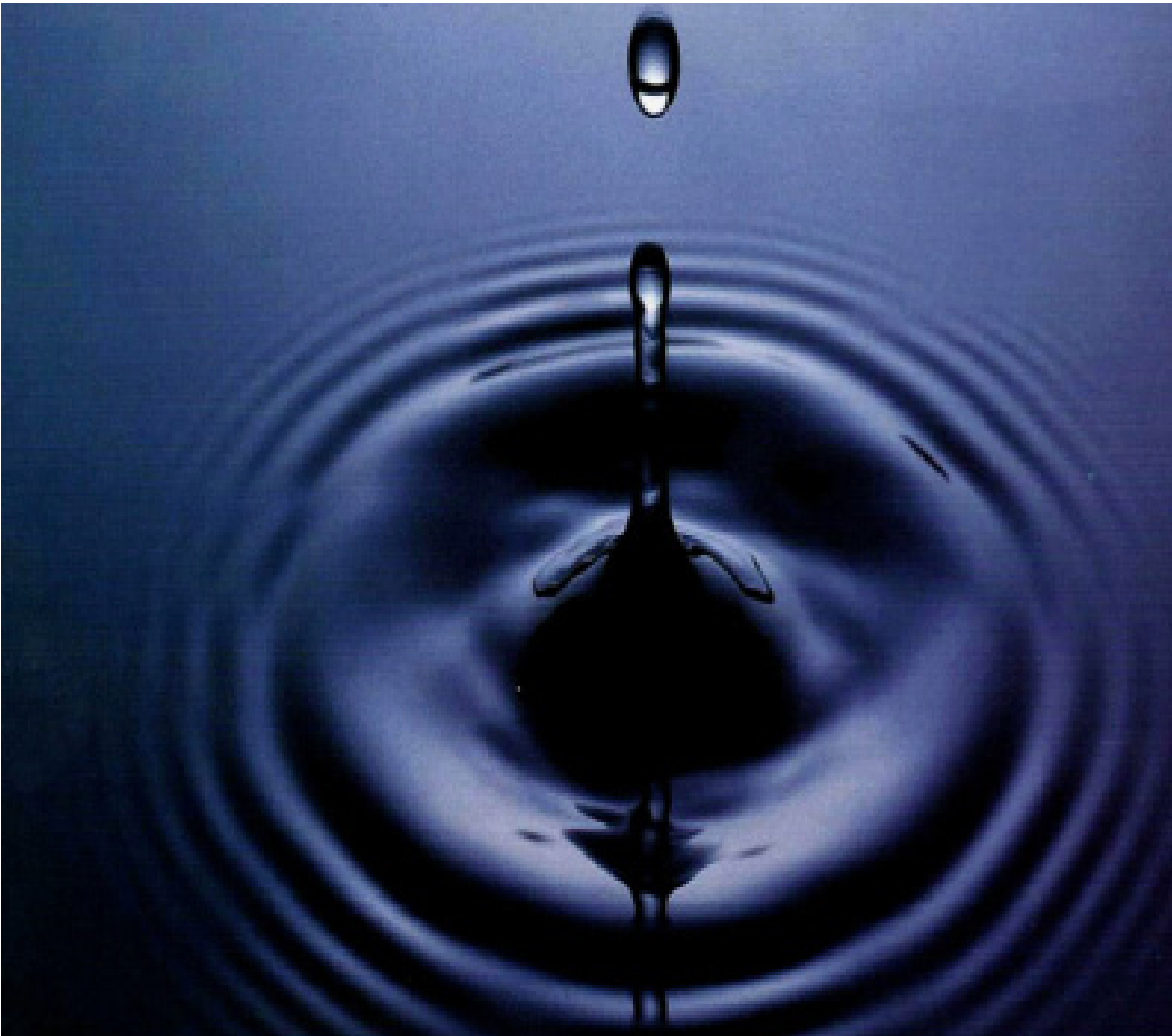
	5	0	-5	-10	-15	-20
5	4	-2	-7	-13	-19	-24
10	3	-3	-9	-15	-21	-27
15	2	-4	-11	-17	-23	-29
20	1	-5	-12	-18	-24	-30
25	1	-6	-12	-19	-25	-32
30	0	-6	-13	-20	-26	-33
35	0	-7	-14	-20	-27	-33
40	-1	-7	-14	-21	-27	-34
45	-1	-8	-15	-21	-28	-35
50	-1	-8	-15	-22	-29	-35
55	-2	-8	-15	-22	-29	-36
60	-2	-9	-16	-23	-30	-36
65	-2	-9	-16	-23	-30	-37
70	-2	-9	-16	-23	-30	-37
75	-3	-10	-17	-24	-31	-38
80	-3	-10	-17	-24	-31	-38


Frostbite Guide

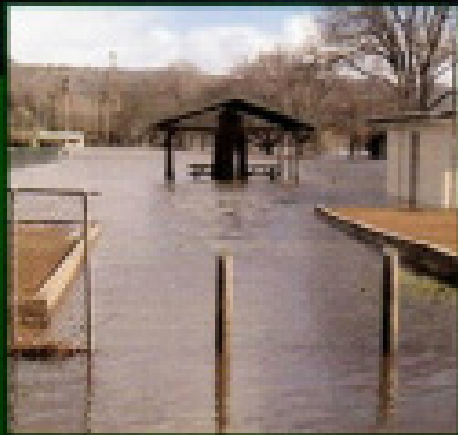
Low risk of frostbite for most people


Increasing risk of frostbite for most people within 30 minutes of exposure

High risk for most people in 5 to 10 minutes of exposure









**National Disaster Management Centre**  
**FLOOD AWARENESS**

## THE DISASTER MANAGEMENT CENTRE OFFERS THE FOLLOWING ADVICE DURING HEAT WAVE CONDITIONS:

- Monitor those at high risk. Infants and children up to four years of age are sensitive to the effects of high temperatures. They rely on others to regulate their environments and provide adequate liquids.
- People who are 65 years of age and older may not compensate for heat stress efficiently, and are less likely to sense and respond to change in temperature. People who are overweight may be prone to heat sickness because of their tendency to retain more body heat.
- Those who are physically ill, especially with heart disease or high blood pressure, or who take certain medications for conditions such as depression, insomnia or poor circulation, may be affected by extreme heat.
- Visit adults at risk at least twice a day and closely watch them for signs of heat exhaustion or heat stroke. Infants and young children need much more frequent watching.
- Air conditioning saves lives during periods of extreme heat. If your residence does not have air conditioning, seek some relief in public spaces such as shopping malls and libraries or use a fan.
- Drink plenty of water and other fluids, but avoid alcohol. Drinks containing alcohol can actually worsen dehydration. Your intake of fluids should be increased even if you are at rest.
- During the hottest hours of the day, stay inside. If possible stay inside an air-conditioned building. The hottest hours of the day are typically from mid-morning to mid-afternoon.
- Dress lightly and when sleeping use lightweight breathable covers.
- Move your exercise routine to early morning or later in the evening - even swimming. Swimming pool dangers related to heat exposure do occur.
- Never ever leave anyone in a vehicle while you run to do a quick errand – no child or pet should be left in a car. It's never safe. The inside of a vehicle can overheat quickly and become an oven. People can succumb to heat exposure and die very quickly in a closed vehicle.

## NATIONAL DISASTER MANAGEMENT CENTRE

# HEAT WAVES AWARENESS



# NATIONAL DISASTER MANAGEMENT CENTRE

## HEAT WAVE AWARENESS

### WHAT IS A HEAT WAVE?

A heat wave is a prolonged period of excessively hot weather, which may be accompanied by high humidity. The South African Weather Service defines a heat wave as "when for three days the maximum temperature is five degrees higher than the mean maximum for the hottest month".

### CAUSES OF HEATWAVES

Heat waves are caused by extremely hot and humid days with very little air movement to help cool the atmosphere.

During heat waves, there is not much wind around to cool down the Sun's heat. This means that most of the heat gets trapped close to the ground and the lower air levels.

### WHY ARE HEAT WAVES DANGEROUS?

Heat waves are deadliest in large cities that rarely experience extreme hot weather, with the elderly and those in poor health conditions in the greatest danger. As our cities and towns get hotter and hotter during heat wave conditions, people and animals have difficulty in keeping cool.

### UNDERSTAND WHY EXCESSIVE HEAT CAUSES PROBLEMS FOR US.

Heat pushes the human body beyond its limits and in the case of extreme heat and high humidity, evaporation rate is accelerated and the body has to work extra hard to maintain its normal temperature. Problems occur when a person is over-exposed to heat or overexert themselves. Those most likely to be impacted negatively by excessive, prolonged heat include the elderly, young children, sick persons, and those who are overweight and unfit. It is important to recognize that over-exposure to heat can be fatal. Possible health problems include:

#### HEAT CRAMPS

These are muscular pains or spasms that occur as a result of heavy exertion. Although heat cramps are the least severe of heat health problems, they are a warning sign that your body is not coping well with the heat.

#### HEAT EXHAUSTION

This occurs typically when people exercise heavily or work in a hot, humid place where bodily fluids are lost through heavy sweating. The blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a mild form of shock. If this goes untreated, the victim's condition will worsen, the body temperature will continue to rise, and heat stroke might occur.

#### SIGNS AND SYMPTOMS OF HEAT EXHAUSTION:

- Nausea
- Vomiting
- Fatigue
- Weakness
- Headache
- Muscle cramps and aches



### HEATSTROKE

The victim's temperature control system which produces sweating to cool the body simply stops working and the body temperature can rise high enough to cause brain damage and death. A victim in this situation needs to be cooled quickly. Note that sun stroke is usually applied as another term for heat stroke.

#### SIGNS AND SYMPTOMS OF HEAT STROKE:

- High body temperature
- The absence of sweating, with hot red or flushed dry skin
- Rapid pulse
- Difficulty breathing
- Strange behaviour
- Hallucinations
- Confusion
- Agitation
- Disorientation
- Seizure
- Coma



#### DURING A HEAT WAVE, THE PUBLIC ARE URGED TO:

- Drink plenty of water. Water is the best liquid for hydration during a heat wave.
- Never leave children unattended, especially outside.
- Never leave children or pets unattended in motor vehicles.
- Take care of pets and other animals – they should not be directly exposed to the sun
- Be aware of the dangers of heat exhaustion.
- Stay indoors in the coolest room of your home as much as possible, and splash your face with cold water to cool down.
- Keep rooms cool by using shade cloth or reflective material on the outside of the window.
- If it is safe to do so, open windows at night when the air is cooler.
- Cyclists are advised not to cycle as they can sustain heat-stroke and cardiac problems.
- Listen to alerts on the radio and television for up-to-date weather reports.
- Avoid hiking and walks, especially from 10:00 to 16:00. If you have to hike during this time, take along plenty of liquids, use an adequate sun-protection, wear suitable clothing and notify somebody of your intended travel plans.
- Learn how to recognize the environmental conditions that exacerbate the dangers of a heat wave.

Surviving a heat wave involves recognizing that you, your family and your community are at risk during a period of prolonged heat and knowing what to do to reduce the risks.

